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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/078,397	02/21/2002	Masakazu Sugaya	520.41238X00	5607

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EXAMINER


HUGHES, JAMES P

ART UNIT	PAPER NUMBER
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2881

DATE MAILED: 12/23/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/078,397	Applicant(s) SUGAYA ET AL.	
	Examiner James P. Hughes	Art Unit 2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Specification

2. The disclosure is objected to because of the following informalities: on page 17, line 10, there is a grammatical error; "pull out" should read – pulled out –. Appropriate correction is required.

Claim Objections

3. Claims 2, 3, 4, 6, 8, and 9 are objected to because of the following informalities. In claim 2, line 2, the term "rod-like" is indefinite as to what is claimed. In claim 2, line 9, the term "split shape portion" is indefinite as to what is claimed. In claim 3, line 4, the term "tip-split shape" is indefinite as to what is claimed. In claim 4, line 4, the term "tip-split shape" is indefinite as to what is claimed. In claim 6, line 4, the term "tip-split shape" is indefinite as to what is claimed.

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In claim 8, line 6, the term "tip-split shape" is indefinite as to what is claimed. In claim 9, line 6, the term "tip" is lacking an antecedent basis. In claim 7, lines 6-7, the phrase "and extracting the beam from the micro-sample, and separating the beam therefrom" is unclear as to where the beam is separated. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 3, and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki (5,727,915). Suzuki teaches a microgripper apparatus and method, comprising a microscope (300), a stage (310) for mounting a specimen, a sample hold system having a beam (100) – which may be conical – attached to a beam manipulator (200) with a drive portion; wherein the beam (100) has tip-split shape a plurality of branch beams (or units) disposed at its tip (102, 103, 113) which are also a first holding member and a rod-like member exchangeable fitted with the first holding member, these units (102, 103, 113) may sandwich and hold a micro-sample in addition to allowing the micro-sample to be detached and separated from the beam. The beam (100) also has a control system and driver (10, 400, 440, 201, 202, 204-208) for transferring the position of and rotating the beam. (Col. 6, line 8 - Col. 8, line 14) The beam may be comprised of numerous materials including silicon nitride, NiCr, and gold (109, 114) (Col. 14, line 19 – Col. 16, line 48)

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Suzuki also teaches a detector (400, 420, 430, 440) to detect when the beam (100) has come into contact with the micro-sample and a driver (10, 400, 440, 201, 202, 203) for transferring the beam in the direction of the stage based on a signal from the detector. (Col. 6, lines 51-67, Col. 16, lines 7-17, and Col. 7, lines 45-59)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki (5,727,915) in view of Shofner (6,3000,631). Suzuki teaches a microgripper apparatus and method as described in section 4 above. However, Suzuki does not teach a focused ion beam milling process to form a micro-sample from a specimen.

Shofner teaches a method of thinning a TEM sample using a focused ion beam, which includes a scanning electron and ion microscopes. Shofner discloses a focused ion beam (FIB) device (5) and associated components and peripherals, such as mounts, are contained in a large vacuum chamber (51). The FIB (5) may emit a beam of ions, which is converged via optical means and focused on a specimen through a system comprising; condenser lens (54), a spaced objective lens (56), and a selectable aperture (58), aligner-stigmator (60), blanker (62), and deflector (64). A support (66) holds specimen stage (68) for mounting a semiconductor or other specimen, wherein the support (66) and specimen stage (68) are connected to a movement

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system (68a,70, 71) that allows movement in the X, Y, and Z direction in addition to various other axes. Additionally, the FIB device (50) may include a secondary electron detector (76), computer (78), deflection system controller (80), and CRT (82) to form an image by a scanning electron microscope. A focused ion beam spot size may vary from micrometers to as small as 5 nanometers, thus the FIB device (50) can make precise drills and cuts. (Col. 3, lines 1-64)

Regarding claim 6, 7, 9, and 10 Shofner also discloses an apparatus and method of fabrication a micro-sample from a specimen, which involves, mounting the specimen on a specimen stage (68), cutting the micro-sample from the specimen with the FIB device (50) – wherein it is possible that the micro-sample may not be completely cut from the specimen. Next, using a light optical microscope (100) and a beam (97) mounted obliquely above the specimen stage – at an angle between 15 degrees and 65 degrees relative to the specimen stage surface – (Fig. 4), removing the micro-sample from the specimen with the beam (97), transferring (moving and rotating) the micro-sample with the beam (97), and mounting it on a micro-sample holder (69) (Col. 4, line 31 – Col. 5, line 43)

Regarding claim 8, in addition to the equipment and method disclosed above, Shofner teaches that the micro-sample holder (69) – which rests on the support (66) and specimen stage (68) – is tilted (rotated) positioning the micro-sample at an angle incident to the focused ion beam, thus the micro-sample may be irradiated with a charged beam. Following, the micro-sample holder (69) may store the processed micro-sample in a mounting holder on the specimen stage. (Col. 5, lines 51 – 65)

It would have been obvious for one of ordinary skill in the art at the time of the invention to use the beam (microgripper) of Suzuki in the apparatus and method of thinning a TEM micro-

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sample of Shofner because as Suzuki discloses, the microgripper can be used for microscopic work including gripping, movement, assembling, deformation, and processing of microscopic specimen while improving the working efficiency of the process. (Col. 1, line 10 – Col. 2, line 40) and Shofner discloses the need for more efficient specimen preparation (Col. 1, lines 14-47 and Col. 5, lines 20-50)

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Itoh et al. (5,656,811) discloses that a scanning electron microscope is interchangeable with a scanning ion microscope for micro specimen fabrication. (Col. 3, lines 44-64) Shichi et al. (US 2002/0079463) teach a method and apparatus for specimen fabrication. Tokuda et al (US 2002/0050565) teach a method and apparatus for processing a micro sample. Moore (US 2002/0121614) discloses a micro-sample extraction method.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James P. Hughes whose telephone number is 703-305-5675. The examiner can normally be reached on Monday - Friday 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Lee can be reached on 703-308-4116. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1782.

James P. Hughes
Examiner
Art Unit 2881

December 9, 2002



JOHN R. LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800